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FLOOD INSURANCE STUDY

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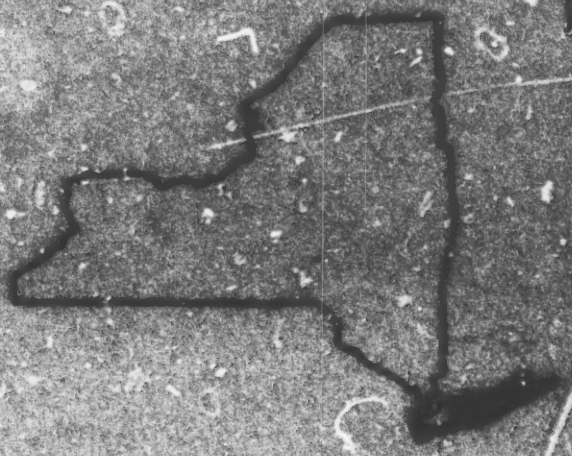
VILLAGE OF BELLPORT, NEW YORK SUFFOLK COUNTY



JUNE 18, 1987

Federal Emergency Management Agency

COMMUNITY NUMBER - 360000

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NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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FLOOD INSURANCE STUDY
VILLAGE OF BELLPORT, NEW YORK

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Village of Bellport, Suffolk County, New York, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in their efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The wave height analysis in this study represents a revision of the original analysis performed by Harris-Toups Associates for the Federal Emergency Management Agency (FEMA). The original work was completed in May 1982. The updated hydrologic analysis for the Great South Bay was performed by the New York District of the U. S. Army Corps of Engineers (COE); this work was completed in May 1985. The updated wave height analysis was performed by Dewberry and Davis for FEMA, under Contract No. EMW-C-0968; this work was completed in November 1985.

1.3 Coordination

On July 29, 1977, an initial Consultation and Coordination Officer's (CCO) meeting for the original study was held to explain the nature and purpose of the study and to identify the scope and limits of the work. This meeting was attended by representatives of FEMA, the village, and Ebasco Services, Inc. (the original study contractor, later replaced by Harris-Toups).

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Upon initiation of the study, a legal notice was placed in the Long Island Advance in October 1978 to notify all interested persons to submit any relevant facts and technical data concerning local flood hazards. The village historian, the village clerk, and the New York District of the COE were all contacted for information to prepare this study.

On November 30, 1981, the final CCO meeting for the original study was held with representatives of FEMA, the village, and Harris-Toups to review the results of the study.

During the progression of this updated study, contact was maintained between FEMA, the New York State Department of Environmental Conservation, and Dewberry & Davis.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Village of Bellport, Suffolk County, New York. The area of study is shown on the Vicinity Map (Figure 1).

Tidal flooding including its wave action from the Great South Bay was studied by detailed methods. This study was revised to reflect updated stillwater elevations on the Great South Bay. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction through November 1990.

2.2 Community Description

The Village of Bellport is located in the southern section of Suffolk County, approximately 42 miles east of the New York City corporate limits at Queens. The village is contained within the Town of Brookhaven, which borders it on the east, north, and west. To the south lies the Great South Bay, which separates Bellport from Fire Island. The major transportation artery is South Country Road (County Route 36), which runs in an east-west direction and divides the village in half.

The total area within the village is 1.4 square miles. The 1980 population of the village was 2,809, a decrease of approximately 8 percent from the 1970 population of 3,046 (Reference 1). This decrease in population is attributed to the lack of developable land and current population trends.

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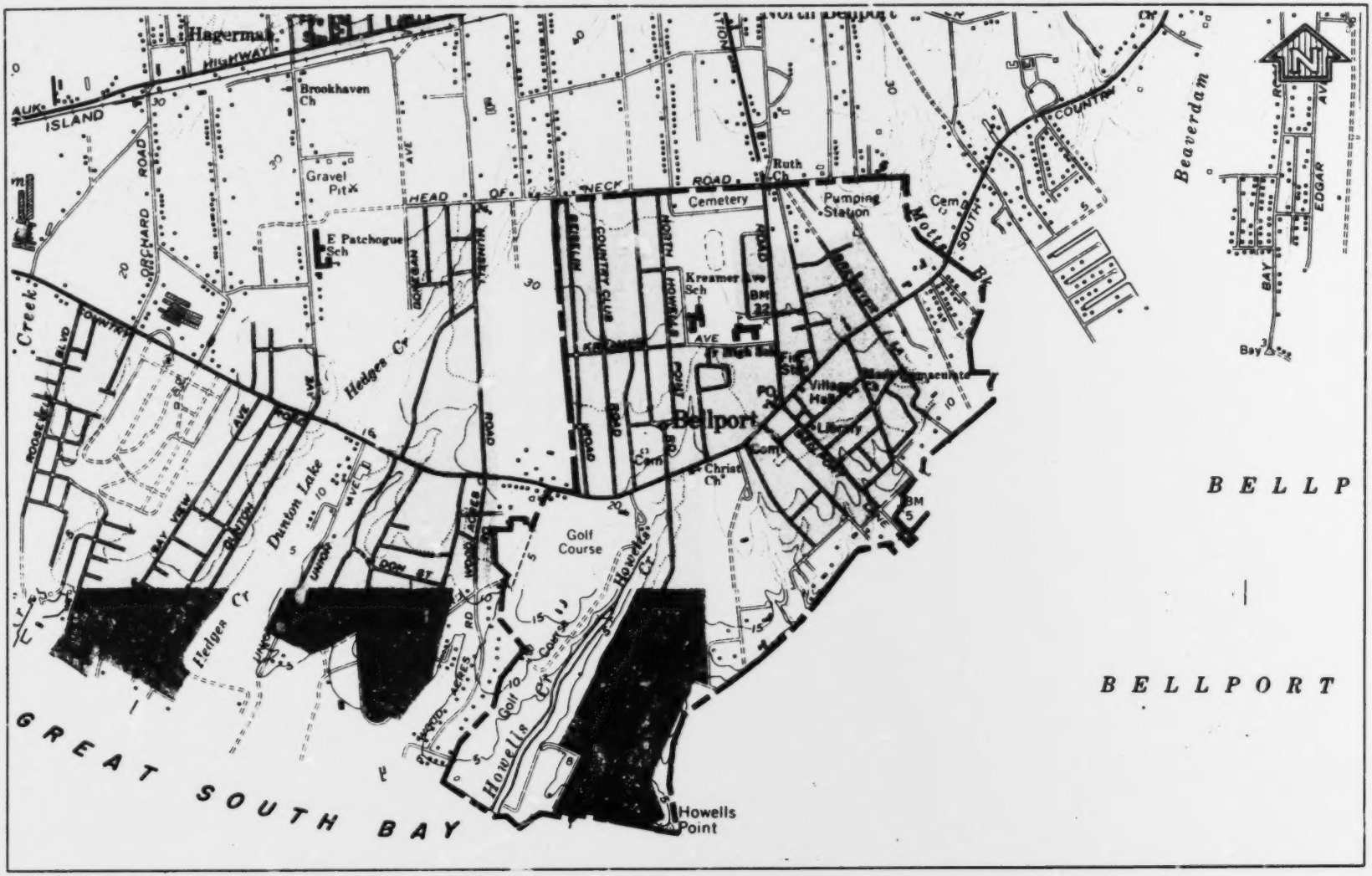

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

VILLAGE OF BELLPORT, NY
(SUFFOLK CO.)

APPROXIMATE SCALE
2000 0 2000 4000 6000 FEET

VICINITY MAP

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The area known as Bellport was sparsely settled in the late 1700s, but it was not until 1829 when the Bell brothers arrived in the area and gave the village its name. The community was part of the Town of Brookhaven, and early industries included farming, fishing, and shipbuilding. These continued until about the time of the Civil War when the area became popular as a summer resort. The village was incorporated in 1910, and when the Brookhaven National Laboratory was started in 1947 the population increased, building up the village to the status it holds today (Reference 2).

The climate in this area is typically moderate coastal, characterized by warm, humid summers and moderately cold winters. Temperatures average 53 degrees Fahrenheit (°F) over the entire year, ranging from a low monthly average of 34°F in February to a high monthly average of 74°F in July. Precipitation averages from 45 to 50 inches annually and is distributed fairly evenly over the year, with June and July being the driest months and November and December being the wettest (Reference 3).

The topography of Bellport is moderately sloping, varying from a maximum elevation of 35 feet in the northern section of the village to approximately 5 feet in the southern part. The soil cover is generally deep and drains well with a low run-off potential where covered by vegetation. Vegetation is of the suburban variety consisting of shrubs, lawned areas, shade and ornamental trees.

2.3 Principal Flood Problems

The village of Bellport is subject to tidal flooding caused by northeasters and hurricanes. Northeasters can occur at any time of the year but are more prevalent in late fall through early spring; whereas hurricanes usually occur in late summer and early fall.

Bellport is primarily zoned for residential development, and that area lies basically in the flood-prone areas. There are some business establishments on the north and south sides of South Country Road that do not experience the problems of coastal flooding. There is also a tract of undeveloped land used as a golf course and village park that experiences flooding from Howells Creek along with tidal surges from the Great South Bay.

The storm of record at the Sandy Hook, New Jersey, gage, occurred during Hurricane Donna on September 12, 1960, and produced a storm tide elevation of 8.5 feet. This storm also produced a tidal elevation of 4.9 feet at the Montauk, New York, gage. The highest water level at the Montauk gage was recorded during Hurricane Carol on August 31, 1954, producing a storm tide elevation of 8.1 feet. The worst northeaster to affect the area occurred on November 25, 1950, and produced storm tides of 7.4 feet at Sandy Hook and 5.9 feet at Montauk (Reference 5).

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A summary of major storms that occurred in the vicinity of Bellport is shown in the following tabulation.

Storm-Type and Date	Sandy Hook Elevation (feet)	Sandy Hook Recurrence Interval (years)	Montauk Elevation (feet)	Montauk Recurrence Interval (years)
Hurricane September 21, 1938	5.5	2.0	*	---
Hurricane September 14, 1944	7.8	25	*	---
Northeaster November 25, 1950	7.4	15	5.9	12
Northeaster November 6-7, 1953	8.1	35	5.6	9
Hurricane Carol August 31, 1954	6.3	3.6	8.1	100
Northeaster October 14-16, 1955	6.4	4.0	4.1	2
Hurricane Donna September 12, 1960	8.5	55	4.9	4.4
Northeaster April 13, 1961	6.9	7.5	3.6	2
Northeaster March 6-8, 1962	7.8	25	4.8	4.2

*No records available

2.4 Flood Protection Measures

At this time, no major flood protection measures have been undertaken that would relieve the existing level of flooding in the Village of Bellport. Along some of the coastline of the village, bulkheading has been installed to protect the area, in some cases, from minor tidal

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flooding and to prevent soil erosion. The elevation of these structures are not all uniform, and extreme storm tides can be expected to exceed their elevations in certain areas.

3.0 ENGINEERING METHODS

For the flooding source studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak elevation-frequency relationships for the flooding source studied in detail affecting the community.

Stillwater elevations for the Great South Bay were obtained from the COE report: South Shore of Long Island, New York, Fire Island to Montauk Point (Reference 4).

The stillwater elevation is the elevation of the water due solely to the effects of the astronomical tides, storm surge, and wave setup on the water surface. The inclusion of wave heights, which represents the distance from the trough to the crest of the wave, increases the water-surface elevations. The height of a wave is dependent upon wind speed and its duration, depth of water, and length of fetch. The wave crest elevation is the sum of the stillwater elevation and the portion of the wave height above the stillwater elevation.

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Wave heights and corresponding wave crest elevations were determined using the National Academy of Sciences (NAS) methodology (Reference 5). The stillwater and maximum wave crest elevations of the selected recurrence intervals are shown in Table 1, "Summary of Stillwater Elevations."

TABLE 1 - SUMMARY OF STILLWATER ELEVATIONS

FLOODING SOURCE AND LOCATION	ELEVATION (feet) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
GREAT SOUTH BAY				
At South Howells Point Road extended	4.2	5.0	5.9	7.9
At Otis Avenue extended	4.5	5.3	6.2	8.2
At Brewster Lane extended	4.5	5.8	6.7	8.7

3.2 Hydraulic Analyses

Hydraulic analyses, considering storm characteristics and the shoreline and bathymetric characteristics of the flooding sources studied, were carried out to provide estimates of the elevations of floods of the selected recurrence intervals along each of the shorelines.

Areas of coastline subject to significant wave attack are referred to as coastal high hazard zones. The COE has established the 3-foot breaking wave as the criterion for identifying the limit of coastal high hazard zones (Reference 6). The 3-foot wave has been determined as the minimum size wave capable of causing major damage to conventional wood frame veneer structures.

The methodology for analyzing the effects of wave heights associated with coastal storm surge flooding is described in the NAS report (Reference 5). This method is based on three major concepts. First, depth-limited waves in shallow water reach a maximum breaking height that is equal to 0.78 times the stillwater depth, and the wave crest is 70 percent of the total wave height above the stillwater level. The second major concept is that the wave height may be diminished by the dissipation of energy due to the presence of obstructions such as sand dunes, dikes, seawalls, buildings, and vegetation. The amount of energy dissipation is a function of the physical characteristics of the obstruction and is determined by procedures described in Reference 5. The third major concept is that wave height can be regenerated in open fetch areas due to the transfer of wind energy to the water. This added energy is related to fetch length and depth.

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These concepts and equations were used to compute wave heights and wave crest elevations associated with the 100-year storm surge. Accurate topographic, land-use, and land-cover data are required for the wave height analysis. For the Great South Bay, maps of the shoreline areas at a scale of 1:2,400 with a contour interval of 2 feet were used for the topographic data (Reference 7). The land-use and land-cover data were obtained from topographic maps, field surveys, and aerial photographs (References 7 and 8).

Wave heights were computed along transects (cross-section lines) that were located along the coastal areas, as illustrated in Figure 2, in accordance with the User's Manual for Wave Height Analysis (Reference 9). The transects were located with consideration given to the physical and cultural characteristics of the land so that they would closely represent conditions in their locality. Transects were spaced close together in areas of complex topography and dense development. In areas having more uniform characteristics, they were spaced at larger intervals. It was also necessary to locate transects in areas where unique flooding existed and in areas where computed wave heights varied significantly between adjacent transects. Table 2, "Transect Descriptions," provides a listing of the transect locations and stillwater elevations, as well as initial wave crest elevations.

TABLE 2 - TRANSECT DESCRIPTIONS

Transect	Location	Elevation (feet) Stillwater 100-year	Elevation (feet) Maximum Wave Crest 100-year
No. 1	Western corporate limits to Howells Point	5.9	8
No. 2	Howells Point to approximately 600 feet southwest of Bellport Lane extended	6.2	9
No. 3	Approximately 600 feet southwest of Bellport Lane to eastern corporate limits	6.7	10

Each transect was taken perpendicular to the shoreline and extended inland to a point where wave action ceased. Along each transect, wave heights and wave crest elevations were computed considering the combined effects of changes in ground elevation, vegetation, and physical features. The 100-year stillwater elevations were used as the starting elevations for these computations. Wave heights were calculated to the

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VILLAGE OF BELLPORT, NY
(SUFFOLK CO)

APPROXIMATE SCALE

2000 0 2000 4000 6000 FEET

TRANSECT LOCATION MAP

FIGURE 2

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nearest 0.1 foot, and wave crest elevations were determined at whole-foot increments along the transect. The location of the 3-foot breaking wave for determining the terminus of the V zone (area with velocity wave action) was also computed at each transect. It was assumed that the beach area would erode during a major storm, thus reducing its effectiveness in decreasing wave heights.

Figure 3 is a profile for a typical transect illustrating the effects of energy dissipation and regeneration on a wave as it moves inland. This figure shows the wave crest elevations being decreased by obstructions, such as buildings, vegetation, and rising ground elevations, and being increased by open, unobstructed wind fetches. Actual conditions in the community may not include all the situations illustrated in Figure 3.

After analyzing wave heights along each transect, wave crest elevations were interpolated between transects. Various source data were used in the interpolation, including the topographic work maps, notes and photographs taken during field inspection, and engineering judgment. Controlling features affecting the wave crest elevations were identified and considered in relation to their positions at a particular transect and their variation between transects. The results of the calculations are accurate until local topography, vegetation, or cultural development within the Village of Bellport undergo any major changes.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study produces maps designed to assist communities in developing floodplain management measures.

4.1 Flood Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For tidal areas without wave action, the 100-year and 500-year boundaries were delineated using topographic maps at a scale of 1:2,400 with a contour interval of 2 feet (Reference 7). For the tidal areas with wave action, the flood boundaries were delineated using

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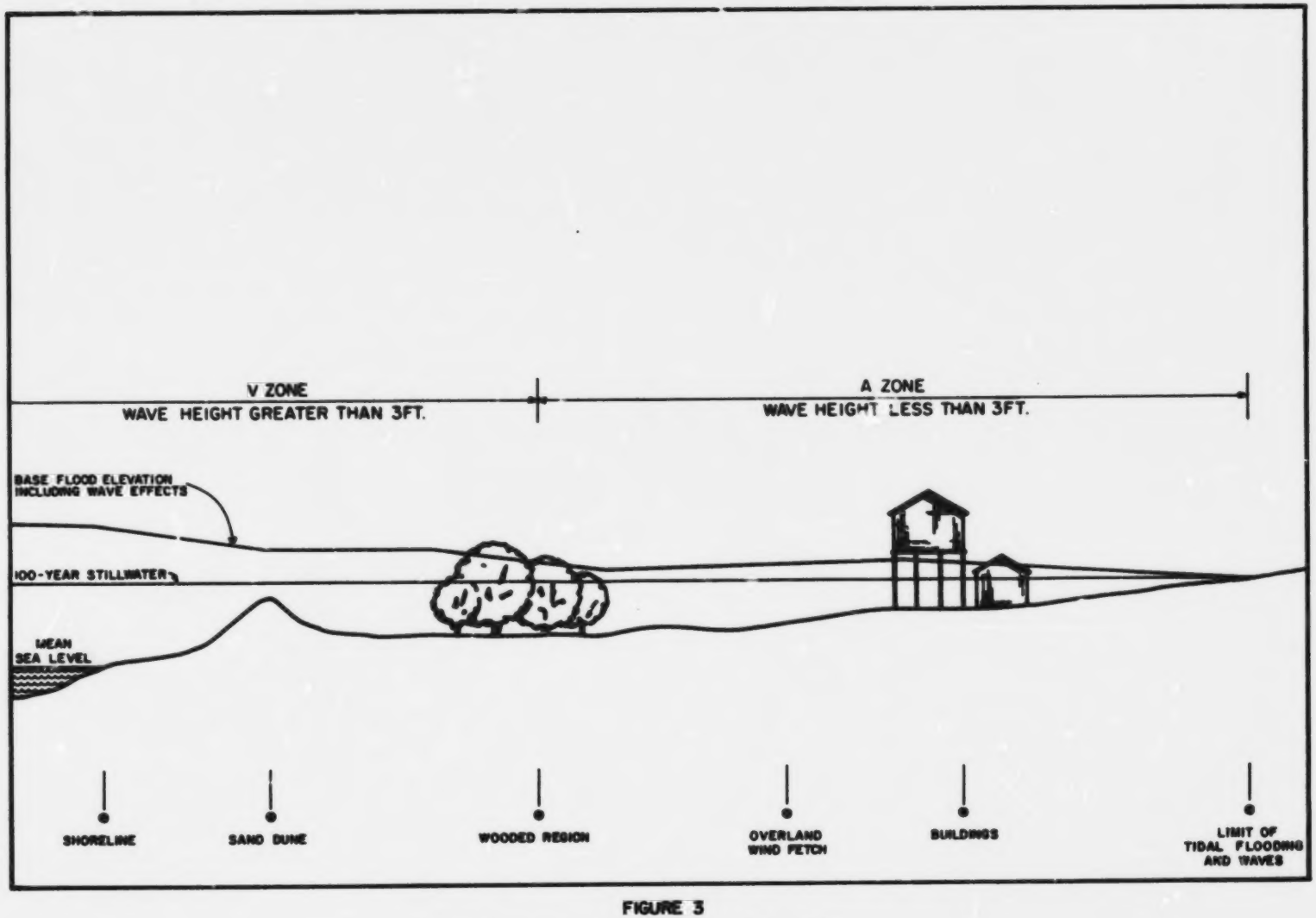

FIGURE 3
TYPICAL TRANSECT SCHEMATIC

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the elevations determined at each transect; between transects, the boundaries were interpolated using engineering judgment, land-cover data, and the topographic maps referenced above. The 100-year floodplain was divided into whole-foot elevation zones based on the average wave envelope elevation in that zone. Where the map scale did not permit these zones to be delineated at one foot intervals, larger increments were used.

The 100- and 500-year floodplain boundaries are shown on the Flood Insurance Rate Map (Exhibit 1). In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

5.0 INSURANCE APPLICATION

To establish actuarial insurance rates, data from the engineering study must be transformed into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors, and flood insurance zone designations for the flooding source studied in detail in the Village of Bellport.

5.1 Reach Determinations

Reaches are defined as sections of floodplain that have relatively the same flood hazard. In areas where a wave height analysis was performed, reaches were determined for areas of the coastline, represented by a transect or group of transects, which have the same physical characteristics. The reaches determined for the tidal flooding source in the Village of Bellport are summarized in the Flood Insurance Zone Data Table (Table 3).

5.2 Flood Hazard Factors

The Flood Hazard Factor (FHF) is used to establish relationships between depth and frequency of flooding in any reach. This relationship is then used with depth-damage relationships for various classes of structures to establish actuarial insurance rate tables.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations rounded to the nearest one-half foot, multiplied by 10, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4

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TABLE 3 - FLOOD INSURANCE ZONE DATA

Flooding Source	Stillwater Elevation 10-Year	Stillwater Elevation 100-Year	FHF	Zone	Base Flood Elevation (Feet NGVD)*
Great South Bay					
Transect 1	4.2	5.9	025	V5	8
			025	A5	6-8
Transect 2	4.5	6.2	025	V5	8-9
			025	A5	6-8
Transect 3	4.6	6.7	035	V7	9-10
			035	A7	8-9
			025	A5	7

*Due to map scale limitations, base flood elevations shown on the FIRM represent average elevations for the zones depicted.

feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year flood water-surface elevations is greater than 10.0 feet, it is rounded to the nearest whole foot.

5.3 Flood Insurance Zones

Flood insurance zones and zone numbers are assigned based on the type of flood hazard and the FHF, respectively. A unique zone number is associated with each possible FHF, and varies from 1 for a FHF of 005 to a maximum of 30 for a FHF of 200 or greater.

Zone A: Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods; no base flood elevations shown or FHFs determined.

Zones A5 and A7: Special Flood Hazard Areas inundated by the 100-year flood; with base flood elevations shown, and zones subdivided according to FHFs.

Zones V5 and V7: Special Flood Hazard Areas along coasts inundated by the 100-year flood that have additional velocity hazards associated with waves of 3-foot amplitude or greater; with base flood elevations shown, and zones subdivided according to FHFs.

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Zone E: Areas between the Special Flood Hazard Areas and the limits of the 500-year flood; areas that are protected from the 100- or 500-year floods by dike, levee, or other water control structure; areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.

Zone C: Areas of minimal flooding; not subdivided.

Flood elevation differences, FHFs, flood insurance zones, and base flood elevations for the flooding sources studied in detail in the community are shown in Table 3.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the Village of Bellport is, for insurance purposes, the principal result of the Flood Insurance Study. This map contains the official delineation of flood insurance zones and base flood elevations. Base flood elevation lines show the locations of the expected whole-foot water-surface elevation of the base (100-year) flood. The base flood elevations and zone numbers are used by insurance agents, in conjunction with structure elevations and characteristics, to assign actuarial insurance rates to structures and contents insured under the National Flood Insurance Program.

6.0 OTHER STUDIES

A Flood Insurance Study for the Town of Brookhaven is currently being prepared (Reference 10). The results of that study will be in exact agreement with the results of this study.

The Long Island Regional Planning Board publication, Hurricane Damage Mitigation Plan for the South Shore of Nassau and Suffolk Counties, New York, was developed to help minimize the loss of life and property due to hurricanes and northeasters in flood prone areas (Reference 11). Although this Flood Insurance Study is based on more recent information, the findings of that study and this study are in accordance with each other.

7.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting the Natural and Technological Hazards Division,

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Federal Emergency Management Agency, Regional Director, Region II Office, 26 Federal Plaza, Room 1351, New York, New York 10278.

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